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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,522	12/13/2005	Yoshio Harada	P28972	6373

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EXAMINER	
GUGLIOTTA, NICOLE T	
ART UNIT	PAPER NUMBER
1794	

NOTIFICATION DATE	DELIVERY MODE
04/08/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/560,522	HARADA ET AL.	
	Examiner	Art Unit	
	NICOLE T. GUGLIOTTA	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 – 5, 7 – 8, 11 – 15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. (JP 2001-164354, disclosed by applicant, examiner has provided a machine translation), in view of Maeda (US 2004/0013911 A1) and Y. Tsukuda (Mat. Res. Bull., Vol. 16, pp. 453-459, 1981).

3. In regard to claim 1, Examiner respectfully reminds applicant product-by-process claims are examined for the product and not the process. Examiner refers applicant to MPEP § 2113 [R - 1] regarding product-by-process claims. "The patentability of a product does not depend on its method or production. If the product in the product-by-process claim is the same as or obvious from a product or the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777, F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citation omitted) Once the examiner provides a rationale tending to show that the claimed product appears to be same or similar to that of the prior art, although produced by a different

process, the burden shifts to the applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi*, 710 F.2d 798, 802, 218, USPQ 289, 292 (Fed. Cir. 1983)

4. In regard to claims 1 – 3, 8, and 12, Harada et al. ('354) disclose a substrate having a metallic film as an under coat and an intermediate layer of Al_2O_3 and $Y2O_3$ under Y_2O_3 sprayed coating formed as a topcoat (Section 0010). This invention is used by the plasma treatment in the plasma atmosphere of the raw gas containing a halogen element (Section 0001). Harada et al ('354) disclose a transparent/white Y_2O_3 top coating.

5. Maeda disclose problems with the use of white yttria coatings. During the plasma etching process halogen gases residues adhere to the component, creating areas of brown discoloration. Because such areas invariably receive more attention in the cleaning operation, in spite of being endowed with good plasma erosion resistance and thus inherently greater longevity, the component tends to be excessively cleaned, shortening its useful life (Sections 0005 and 0006).

6. Tsukuda discloses black Y_2O_3 pieces are obtained by heating in a reducing atmosphere, and they have some properties other types of Y_2O_3 do not have (Abstract, page 453).

7. It would have been obvious to one skilled in the art at the time the invention was made, for reasons taught by Maeda, to desire a black yttria coating. Based upon the

disclosure of Tsukada, it would be obvious to attain such a coating in an oxygen deficient environment.

8. In regard to claim 4, Harada ('354) disclose the undercoat to be one or more sorts of the metal alloys chosen from nickel and it's alloy, W and its alloy, Mo and its alloy, Ti, and its allow, with a thickness of 50 - 500 μm (Section 0009).

9. In regard to claims 5 and 15, Harada ('354) disclose the intermediate layer to be a mixture of Al_2O_3 and Y_2O_3 (Section 0011).

10. In regard to claim 7 and 17, Harada ('354) disclose the top yttria layer has a thickness of 50 – 2000 μm (Section 0017).

11. In regard to claim 13, Harada et al. ('354) disclose the Y2O3 thermal spray material with a pressure of 50 - 200 hPa about an atmosphere pressure with Ar gas (Section 0025, Example 1).

12. In addition, Tsukuda et al. disclose "the green compacts were sintered at 2373 ~ 2573 K for 30 ~ 120 min in H_2 atmosphere (d.p. 237 and 293 K). The Y_2O_3 sintered pieces shown in Figure 1 were colorless and black" (Page 454, paragraph 1). Tsukuda et al. did not explicitly disclose the pressure of the H_2 atmosphere. Therefore, it would have been reasonable for someone of ordinary skill in the art to interpret this lack of

information in regard to the pressure to mean the H_2 atmosphere was at standard atmospheric pressure (1 atm) for attaining the black yttria.

13. Applicant claims a pressure of 50 – 600 hPa. This range is equivalent to 0.592 – 2.46 atm.

14. In regard to claim 14, applicant claims the inert gas atmosphere includes an environment of a heat source for an atmosphere plasma spraying surrounded with a gas such as Ar, N_2, or the like so as not to penetrate air into the heat source.

15. Harada et al. ('354) disclose an Ar gas atmosphere (Section 0025, Example 1). Tsukuda et al. disclose heating at 2073 K in an atmosphere of H_2 (inert gas atmosphere).

16. Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borglum, (and further evidenced by Hidekazu et al (JP 59096273) and JP 6104062 (reference provided by applicant on 3/13/2006)), in further view of Hanagata et al. (U.S. Patent No. 5,057,335).

17. Neither Harada et al., Maeda, or Tsukuda disclose remelting the Y2O3 top coating surface.

18. Hikekazu et al. disclose making the surface of a ceramic dense (remolten) by means of laser irradiation after a establishing a metallic bonding layer and a ceramic layer on a substrate which is comprised of a heat resistant alloy of a predetermined

shape (English Translation, Page 4, last paragraph). ZrO_2-Y_2O_3 was used for the ceramic layer (English translation, Page 5, 4th line of last paragraph). The erosion resistance is improved along with increasing the heat shielding and corrosion resistance by making the ceramic layer surface dense (English Translation, Page 6, second paragraph). Hikekazu et al. is silent with regard to the thickness of the oxide coating produced from the laser beam irradiation.

19. Hanagata et al. disclose the ceramic coating can be formed in a thickness of, for example, 0.1 to 50 μm on a desired area in the spot size within the limitation of the wavelength of the laser beam. However, the maximum thickness of the coating is not limited to the thickness mentioned above.

20. It would have been obvious to one skilled in the art at the time the invention was made to remelt the surface of a substrate with a yttria coating (or remelt the surface of a yttria sintered product), as this has been shown to densify (decrease the porosity) of the surface and further protects the substrate from corrosion. The remelting of metal oxide surfaces using laser or electron beam irradiation for densification is further evidenced by JP 6104062 (Abstract).

21. Claims 9 and 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. ('354), in view of Maeda and Tsukuda, as in claim 8, and in further evidence of Morris (U.S. Patent No. 5,024,992).

22. In regard to claim 9, Neither Harada et al., Maeda, nor Tsukuda disclose the use of laser irradiation to form the black yttria coating. However, Morris discloses superconductors $YBa_2Cu_3O_{7-\delta}$ for a film. The metals or oxides can be combined by applying them in an intimate mixture as a coating on a suitable substrate to form a film on the substrate. This may be done by high vacuum evaporations, plasma coating, decomposition of organometallics, *laser ablation coating* (corresponds to applicant's laser beam) or other known coating methods (Column 4, Lines 50 – 55). Above about 700°C, with the loss of oxygen, the structure changes from orthorhombic to tetragonal. During cooling after synthesis, the structure changes back to orthorhombic as oxygen is absorbed. The existence of two phases gives rise to internal stresses in the material during cooling, causing twinning and its associated detrimental effects (Column 2, Lines 8 - 14). Oxides therefore tend to be partially reduced by heating to high temperatures, and compounds with relatively low oxygen content will be formed at high temperatures (Column 2, Lines 62 – 65).

23. By applicant's own admission in their remarks filed 12/21/2007 (Page 8, last paragraph), according to applicant's present invention, the white yttrium oxide spray coating is change into a black color by irradiating an electron beam or laser beam onto the surface of the spray coating. As a result, a part of the Y_2O_3 is change to form Y_2O_{3-x} which is black in color.

24. It was known in the art at the time the invention was made that (A) the removal of oxygen from an yttria surface yields black Y_2O_3 (as disclosed by Tsukuda) and (B) that a high energy irradiation with a high temperature, such as laser ablation, would remove

oxygens (as disclosed by Morris). Therefore, it would have been obvious to one skilled in the art at the time the invention was made that A + B = C, "C" being that irradiation of a high energy beam (laser or electron) would darken a white yttria surface (producing black yttria).

25. In regard to claim 10, it would have been obvious to one skilled in the art at the time the invention was made that any high energy irradiation, whether it be laser beam or electron beam, with the addition of heat, would provide sufficient energy to weaken the bonds between yttrium and oxygen to reduce the yttria, as disclosed by Morris.

Response to Arguments

26. Examiner acknowledges U.S. Patent Application Publication No. 2004/0013911, published January 22, 2004, would qualify as a § 102(b) document. Examiner notes with appreciation applicant's honesty in regard to the quality of this art.

27. Applicant argues that Maeda fails to disclose an Y_2O_3 black spray coating, wherein the Y_2O_3 black spray coating is generated by a laser or electron beam process, as amended by claim 1. Applicants respectfully submit that Maeda does not anticipate the present claims 1 – 7 at least because it does not disclose a laser or electron beam.

28. Applicant's arguments with respect to claim 1 - 7 in view of Maeda have been considered but are moot in view of the new ground(s) of rejection.

29. Examiner acknowledges claim 1 has been amended to a product by process claim. Product by process claims are examined in light of the product, not the process. Therefore the rejections of claims 1 -7 are maintained under 35 U.S.C. § 102/103.

30. Applicant notes that Maeda does not disclose a *"a white Y_2O_3 powdery material…plasma-sprayed direction on a surface…to form an Y_2O_3 black coating"*, as recited in claim 8. Applicants submit that Maeda does not anticipate method claims 14, 15 and 17, which are dependent on allowable claim 8, at least because it fails to disclose a black coating generated from a white Y_2O_3 plasma spray.

31. Applicant's arguments with respect to claims 14, 15, and 17 have been considered but are moot in view of the new ground(s) of rejection.

32. Applicant argues Maeda discloses white Y_2O_3 powder being plasma sprayed onto an article but the resulting Y_2O_3 coatings are not black but rather almost white. The L* values of each of the Maeda products in the Comparative Examples are 92.4 and 91.5, respectively is almost white. Applicants respectfully remind the Examiner that an L* value of 100 is white and L* value of 0 is black.

33. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

34. Applicant argues Maeda changes the sprayed coating into gray or black is attained by adding color-imparting material to the spraying material. According to

applicant's present invention, the white yttrium oxide spray coating is changed into the black color by irradiating an electron beam or laser beam onto the surface of the spray coating

35. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

36. Applicants note that Borglum relates to Y_2O_3 sintered bodies but does not disclose any spray coating or methods thereof. Thus, Applicants submit that there is no motivation to combine Maeda with Borglum.

37. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE T. GUGLIOTTA whose telephone number is (571)270-1552. The examiner can normally be reached on M - Th 8:30 - 6 p.m., & every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NICOLE T. GUGLIOTTA
Examiner
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/Carol Chaney/

Supervisory Patent Examiner, Art Unit 1794